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OFFICIAL PUBLICATION

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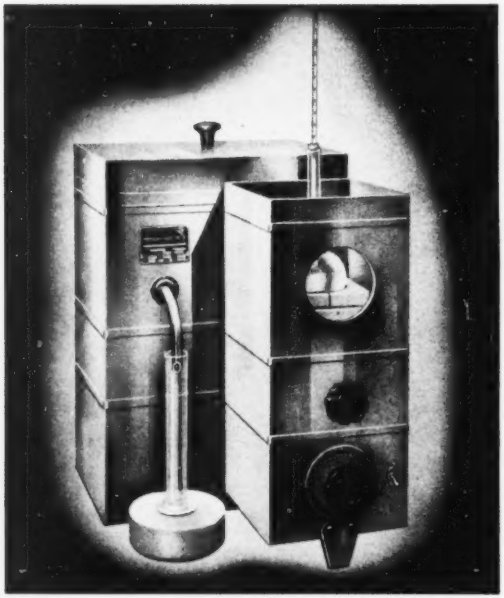

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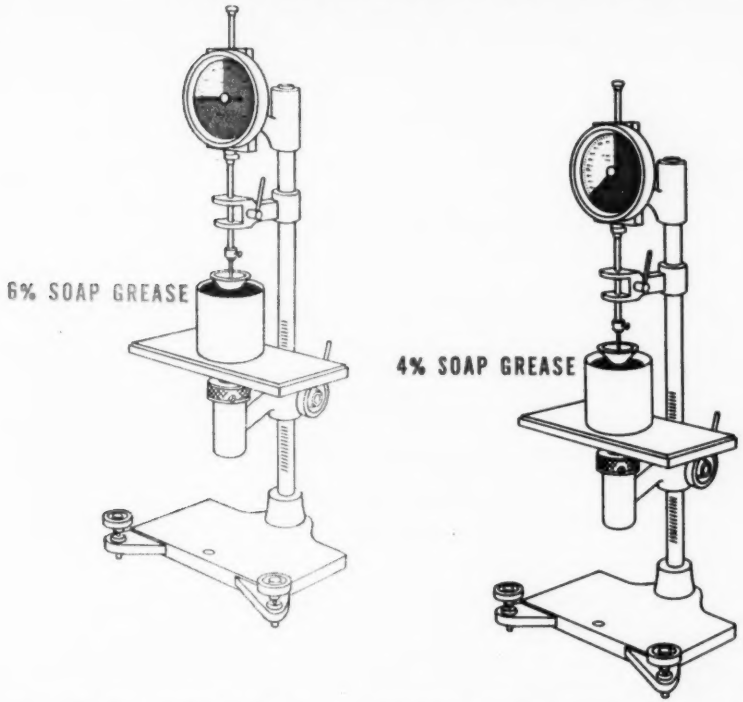

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The INSTITUTE Spokesman

Volume XV Number 4 July 1951

IN THIS ISSUE

ABOUT THE COVER

This picture of the U. S. Army's T41 Light Tank, popularly known as the Walker Bulldog, is of interest because of the extreme demands such a mechanism makes on the lubricants involved. The problems presented by any piece of heavy-duty machinery are sometimes difficult for the lubricating engineer; when this heavy machinery must function perfectly against the stresses of violent motion, under all extremes of temperature and climatic conditions, these problems are magnified to a remarkable degree.

It is, therefore of interest to note that the Army's Ordnance Department has adopted a BENTONE grease for the lubrication of two critical elements on the Walker Bulldog tank—the turret and the gun mount. The BENTONE grease was selected after a series of rugged tests, details of which have not been supplied, but it is understood that the selection was based on excellent resistance to water, good metal adhesion, and superior performance under conditions of heavy pressure and extreme temperature variations.

This evidence of the particular suitability of BENTONE grease to extreme service conditions comes as no surprise to National Lead Company's Baroid Sales Division. During the course of their work on greases which employed BENTONE as a gelling agent, Baroid had subjected these greases to long series of tests, and the Baroid men were rather inclined to the opinion that no tests the Army could devise would be any more rigorous than their own. In fact, they were quick to point out that the BENTONE greases have important characteristics not covered by the Army tests, as demonstrated in the very considerable body of experience built up by Baroid during their testing and development work— experience which is available to anyone who wishes to inquire further into the properties of BENTONE greases.

President's page

by Howard Cooper, President, N.L.G.I.

ESSENTIALITY

The word "essentiality", not often employed in day to day conversation, came into its own in World War II among the various regulating agencies of the government in classifying materials, products and services with respect to priority position. Now again the term is looming big as new or reinstated rules and regulations are being imposed in connection with the defense program.

It is not easy to evaluate materials and things in proper sequence of essentiality. Rating involves many complexities and ramifications; it must consider the over-all, including confidential military aspects which for security reasons cannot be publicized. Regulating agencies are often maligned for lack of understanding, when in fact their actions may be in the best interest of all of us.

Consider the automobile for example; what is its relative essentiality? The automobile has long since ceased to be a "pleasure" car, as it was called in its earlier days of unreliability; today, it is a means of transporation, with which present-day life in the United States is intimately entwined. If the automobile were removed today's plan of living would be compelled to undergo drastic backward changes and dislocations. The automobile takes the husband to work, the housewife to the food markets (now more often than not located remotely from residential areas), and it gets the children to schools, which are centralized and serve wide areas. In many localities no other transportation is available. Certainly the automobile cannot be considered non-essential, for it is too closely keyed to rural, suburban and urban ways of living as they have developed in recent years. We could not get along very well with too many fewer automobiles. Yet, if the fighting forces need steel and other materials for tanks, aircraft, navy vessels and munitions, every true patriot will quickly agree that we can get along with fewer new cars by exacting a fuller measure of service life out of those already built.

While a case may be made for the essentiality of the automobile, the need for optimum production of new cars during an emergency period can be a different matter. At the same time the acceptance of this premise immediately top-grades the essentiality position of lubricants, not only for the automobile but for farm equipment, industrial machinery and munitions production plants. Extension of service life of mechanical equipment is not attainable, if compromises in lubrication are permitted.

Years of research have been spent seeking to reduce wear, maintenance and replacement of parts through more effective lubricants, with an objective of lenthening the useful life of machines of all kinds. Desirable always in a peace time economy, the importance of lubrication in the defense and war mobilization effort must not be underestimated or discounted. The materials required to provide lubricants which will reduce wear and maintenance and will extend the operating life of mechanical equipment logically rate a top level priority position for such usage and application. Deficiency in vital military and civilian output is encouraged if in addition to denial of new machinery full recognition is not given to the essentiality of materials required to make the kind of lubricants which will promote maximum service life for existing equipment.

A PLEA FOR *Uniform Packaging* OF

INTRODUCTION

THAT mysterious cult known as the Advertising Profession states that conducting a business without Advertising is like winking at a girl in the dark—*you* know what you're doing, but nobody else does.

And it certainly seems to me that our brethren of high-powered sales have a point that Engineers could well afford to adopt with reference to their problems.

For years, designers and builders of grease dispensing equipment, and all those concerned with the stocking, selling and dispensing of lubricating grease have been plagued with the lack of "standardization" regarding the physical dimensions of grease containers. Nothing has happened from an Industry-wide standpoint to change this regrettable situation, despite the fact that Industry has standardized on everything else from brooms to labor policies for obvious reasons of economy and efficient operation.

The time has certainly come, we believe, to "advertise" this situation for the wasteful problem it is, and to actively seek a constructive solution. We realize, of course, that the N.L.G.I., as an organization, is not qualified legally or otherwise to promulgate or establish standards or specifications. But we do believe that the members of the Institute, representing influential segments of the Petroleum and Lubricating Equipment Industries, can render an invaluable service to Industry in general and no less to themselves by helping to make a practical program of Standardization a reality.

THE PROBLEM:

In order to quickly review the problem, we will group grease containers into three classifications: (1) Pails of 25 lb., 35 lb., 40 lb., and 50 lb. sizes; (2) 100 lb. drums of Eastern and Western style; and (3) the 400 lb. drums, totaling seven major groups.

To graphically illustrate the variations in physical dimensions of these various containers, some illustrations have been prepared which show these differences in chart form. No attempt has been made to cover in these charts all the units used by the many manufacturers of lubricating grease, but they do show the major variations. The dimensions, illustrated, have been taken directly from manufacturer's specifications.

FIGURE 1 — PAILS

On the right side of the figure there is pictured a full view of the so-called normal container. On the left side is shown the position of the bead of the various containers in relationship to height and diameter. The variations in the 25 lb. pail are 1⅞" in diameter and 2½" in the height. The 35 lb. pail varies ⅝" in diameter and 15/16" in height. The 40 and 50 lb. pails reflect less variation, but are shown to bring out the diversification of the major container size. Why four sizes with only a 25 lb. capacity difference? Strangely enough, there is a standard for 25 lb. and 35 lb. pails. Both are a 11¼" diameter with a height of 9 3/16" for 25 lb. pail, and 13½" for the 35 lb. pail. (Note the position of the two black beads on the chart, marked "Gov't. Std.")

This is a joint Army-Navy specification JAN-P-124A which is a must when furnishing grease for Military requirement in 25 or 35 lb. packages. Such an established specification could well form the basis or starting point for an entire Standardization Program, possibly deleting those standards applying to types of sizes of containers not commonly used in the Lubricating Grease Industry. It is interesting to note that one grease container manufacturer mentions the Government Specification as being of definite practical value in Industry.

FIGURE 2 — 100 LB. EASTERN AND WESTERN DRUMS

In the overall category, there are two major groups of containers commonly referred to as Eastern and Western Style Drums. This situation alone requires the Grease Dispensing Equipment Industry to double the number of required visible drum units and to greatly enlarge the size of the cover on the decorative sleeve models. Some of these drums are 110 lbs., thus further complicating the situation. The Eastern Drums vary from 14" to 15¼" in diameter, or a total of 1¼", and in the overall height from 21⅞" to 24", or 2⅛" total. The Western Drums show a variation of ⅜" in diameter and a normal variation in height, but obviously differ from Eastern style to such an extent that the same dispensing equipment cannot operate in both styles.

LUBRICATING GREASE

by L. C. ROTTER
Lincoln Engineering Co.

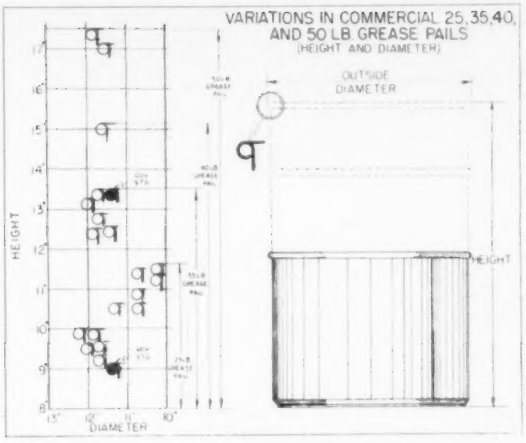

Figure 1

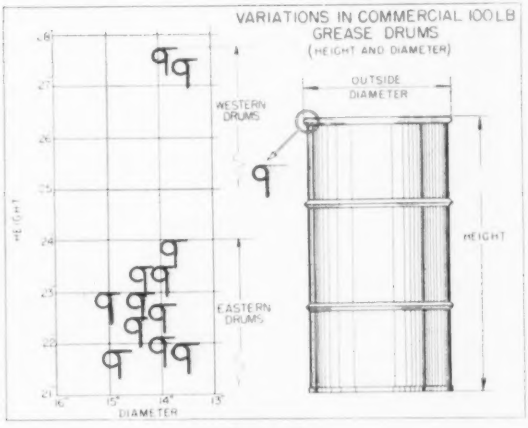

Figure 2

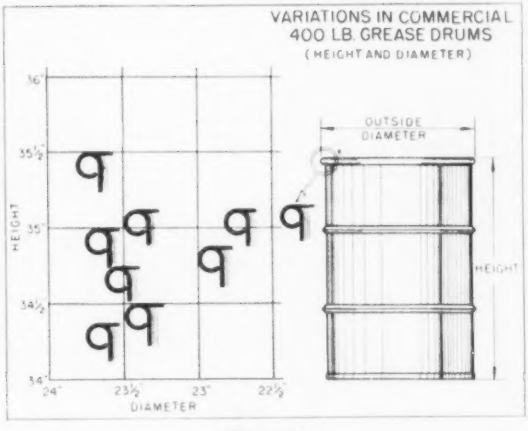

Figure 3

FIGURE 3 — FINALLY THE 400 LB. DRUMS

The 400 lb. containers offer a variety of sizes ranging from 22 13/16" to 23 13/16" on the diameter—a total variance of 1"; or from 34⅜" to 35½" on the overall height—a total variance of 1⅛". Throughout all three of the previously mentioned major groups, abnormally off-sized containers have been discovered in the field. Most of these originated under war-time conditions, or during times of material shortages and have not been listed here since we wish to confine this presentation to the containers meeting the specifications of the various grease manuufacturers, and used as a normal part of the operating job.

Of course, the variation in the sizes of grease containers has no effect on their capacity to perform their required task. However, the function started by the sale of the lubricant to the customer is not completed until the lubricant is injected into the bearing with some type of dispensing device. The following figures point up the major problems created by the varying containers.

FIGURE 4 — VARYING HEIGHT OF DRUMS

Assuming the length of the dispensing pump tube to be standard, an Extra High Drum causes the whole pump assembly to be raised in relation to the bottom of the drum. Using the Eastern style 100 lb. drum as an example, the variation of 2⅛" in overall height would cause two more inches of lubricant to be left in the bottom of the drum than normally remains. The customer, after removing those several extra inches a few times by hand, will soon tire of that tedious, messy task, and register a justifiable complaint. In the case of a large volume Gasoline Service Station, a good percentage of that station's grease rack profits would be eliminated, or added expenses incurred if the lubricant were removed by hand methods, labor costs being what they are.

With Extra Short Drum the reverse is true. The bottom of the pump tube contacts the bottom of the container before the drum cover contacts the top of the drum at the bead. The drum cover serves to locate the pump and hold it in its normal central position. Under these conditions the pump will fall to the side exposing the lubricant to subsequent contamination.

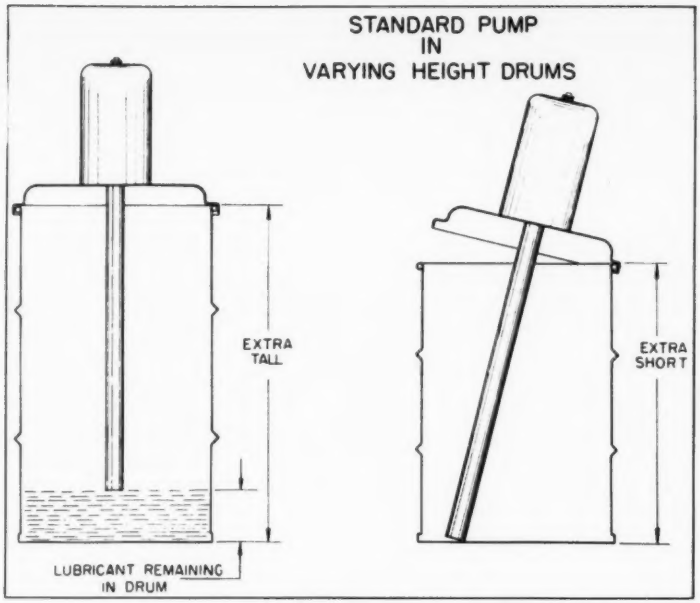

Figure 4

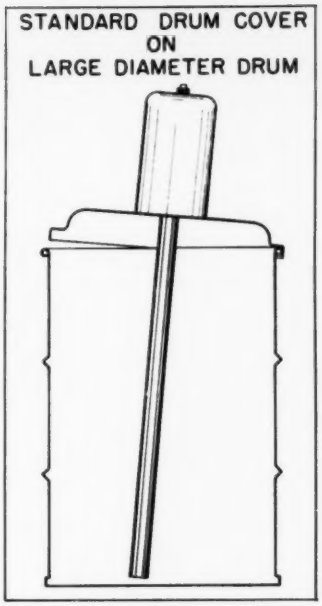

Figure 5

FIGURE 5 — CONTAINERS EXTRA LARGE ON THE DIAMETER

Under this circumstance, the normal sized drum cover is not large enough in diameter to fit over the edge of the container bead. This not only raises the position of the pump in relation to the bottom of the container, but also leaves the pump in a very unstable position. Of course, the diameter of the drum cover can be increased to meet these requirements, but we never seem to get one big enough, and at the same time, the variation to the small side would make this larger drum cover unsuitable for clamping on the small O.D. drums. At present we are supplying two sets of different length bolts with each drum cover assembly to meet more nearly all field conditions.

FIGURE 6 — EFFECT OF DRUM DIAMETER ON USE OF FOLLOWER PLATES

At the same time the diameter variation causes difficulties in effective employment of follower plates which are used with the heavier, non-following lubricants. The follower plate adds its cast iron weight to the surface of the lubricant and also seals the vacuum created as the lubricant is pumped out of the container below the follower. These followers should fit reasonably close to maintain this seal, but with the variety of inside diameters this is next to impossible. In addition, the packaging of the heavier lubricants, such as the popular all-purpose greases in half-open drums, prevents the use of a follower plate and, as a result the grease pump leaves a large quantity of lubricant in the container.

FIGURE 7 — 25 AND 50 LB. UNITS

This standard model pump used for the dispensing of lubricanting grease from original 25 lb. and 50 lb. refinery containers offers a choice of three different follower plates. The proper size can be determined only after measuring the inside diameter of the container being used. This indicates the acceptance by our industry of this inherent problem. However, if the customer who has bought this grease dispensing device changes his lubricant source he may find a need, eventually, for all three sized follower plates.

FIGURE 8 — PRESSURE PRIMER

In the Industrial field a trend has been noticeable within the last few years that further complicates this problem. In the interest of economy and good housekeeping, Industrial users of relatively large quantities of lubricants—as on production line operations of truck and farm implement manufacturers—are using elevating and drum cleaning devices, as pictured in this figure. This device is simply a follower plate attached to the pump tube of the dispensing equipment. This follower plate and pump are loaded pneumatically to apply pressure to the top surface of the lubricant, and also provide a lifting device for the pump when it is necessary to remove it from the drum. As noted above, the variation in drum size would cause trouble with this follower. A resilient sealing member around the periphery of the follower wipes the drum clean if grease is consistently furnished in drum of same diameter. A follower of this type will take care of normal production tolerance of a specific diameter. You can readily picture customer reaction to a shipment of grease from the same source of supply in a different size drum after investing in equipment of this type for dispensing the lubricant.

FIELD COMPLAINTS

Several recent field complaints confirm some of the previously mentioned problems. In the one case, our California office advised us that they were obliged to shorten the lengths of our standard pump tubes by ½" in order that the bottom of the tube would not contact the bottom of certain containers. Our files showed that two years ago we had lengthened these pumps to answer complaints of that

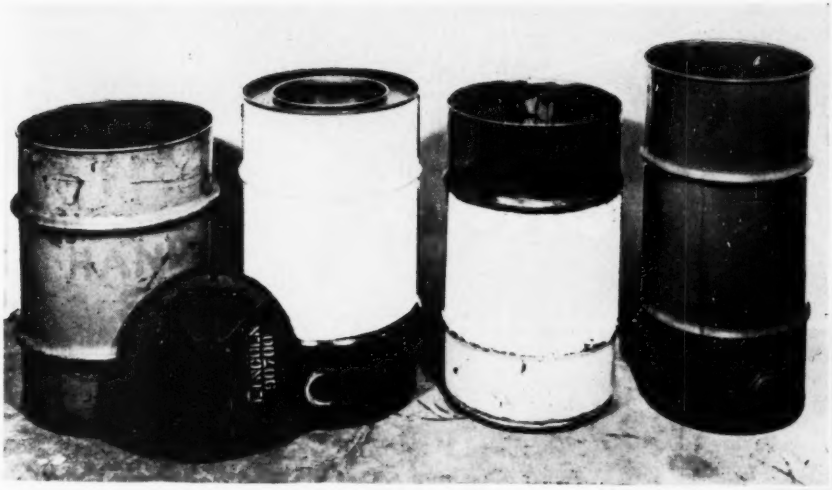

Figure 6

Diameter variation causes difficulties in effective employment of follower plates which are used with the heavier, non-following lubricants.

date from the same field force. In view of this we wrote the grease manufacturers involved and were given the name of the steel fabricator of the containers in question. Correspondence with this fabricator revealed the fact that they were aware of the variance in the critical dimensions, but that correction had been delayed pending the establishment of standards within their own organization. At this time, new fabricating tools are being made, and a standard drum, as far as one company is concerned, is assured.

Another field complaint, originating in one of our eastern territories, conveyed reports from our customers that the drum cover supplied with one of our popular visible drum models would not fit over the bead of a particular 100 lb. drum and, as a result, the pumping unit could not be secured to the container. Within a few days, similar reports were received from Portland, Pittsburgh and St. Louis. In each case the lubricating grease distributor explained that he had received new shipments of packaged grease from the manufacturer in recent days. In the St. Louis area about 200 individual packages were involved. A check with the grease manufacturer showed that their normal specifications dictated the use of containers which would easily fit the standard drum cover. However, in this instance, a shortage of containers had forced them to use a non-standard drum. In this case and many others a number of grease manufacturer customers and grease dispensing equipment customers were dissatisfied, at least temporarily, by the failure of the package and equipment to compliment each other.

CONCLUSION

An excellent editorial entitled "Most Oil Companies Believe Uniformity in Containers Would Cut Handling Costs," published in the August 8, 1948 issue of NATIONAL PETROLEUM NEWS states—

> "Oil companies are achieving standardization of packaging within the individual company organization by carrying out continuing studies of their own problems and by working with container manufacturers, but most companies contacted by NPN in a survey believe further standardization is desirable and could be accomplished.
>
> Companies generally would cooperate in a limited standardization program if it were conducted by a responsible disinterested organization, the survey shows.
>
> In seeking information on the need for standardization, NPN did not ask for data on color of packages

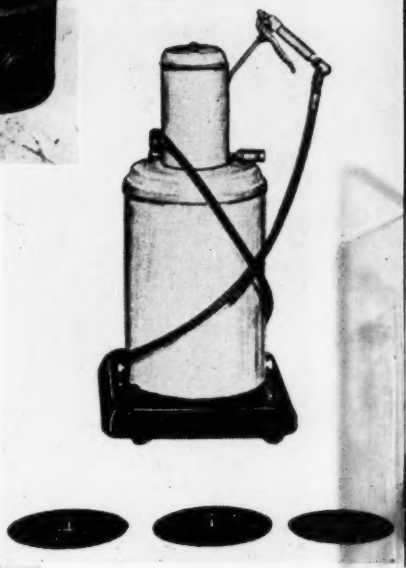

Figure 7

This standard model pump used for the dispensing of lubricating grease from original 25 lb. and 50 lb. refinery containers offers a choice of three different follower plates.

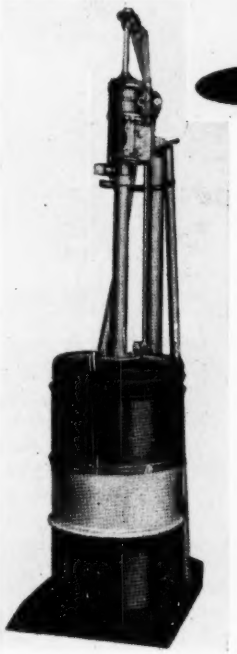

Figure 8

In the interest of economy and good housekeeping, Industrial users of relatively large quantities of lubricants are using elevating and drum cleaning devices, as pictured in this figure.

Sometimes it's hard to choose

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or labels and other printing on the containers. This is believed to be an individual company problem and is closely tied in with brand identification and advertising.

Almost all major oil executives contacted believe industry-wide efforts would bring about further standardization with resulting reduction in warehousing, transportation, marketing and other costs."

The feelings expressed in 1948 have not been allowed to go unheeded. I understand that within the Packaging Institute, Inc., there is a Petroleum Sub-Committee which is at work on all phases of packaging in the industry, and is paying particular heed to various sources regarding the matter of uniformity of containers.

Also, even more recently, our Institute joined hands with the American Petroleum Institute to form a Joint Container Committee. This Committee started its work in the fall of 1950, and a preliminary survey has been made of the particular problems besetting the lubricating equipment manufacturers pertaining to the difficulty in designing pumping units to fit the multitude of various size containers.

Both of these lines of endeavor are certainly steps in the right direction, but I feel that my purpose here is to ask that all concerned recognize the urgency of this situation and get into action as soon as possible, because, as you have seen, not a day goes by without our having to cope with this serious problem.

Executives of most lubricating grease manufacturers indicated in their interview with Mr. Charles Boyd, Jr., who conducted the NPN survey, that it was their belief an industry-wide standardization program would bring benefits in many related fields other than that of grease dispensing equipment. A few of the more obvious are:

1) Consolidation of container purchasing and manufacture.
2) Reduction in cost of container manufacture. Container fabricators would be able to set up production facilities on standard drums for longer runs to supply a number of different grease manufacturers.
3) Reduction of warehousing costs through better storage and by the ability to make smaller purchases of standard articles.
4) Simplification of customer selection by reduced number of packages of one item.
5) Limited Container sizes with automatic reduction of inventory.
6) More efficiency in the handling, filling and shipping of containers.

We have reviewed the problem resulting from lack of packaging standardization from the viewpoint of the manufacturers of lubricating grease dispensing equipment. And I can safely say that a packaging standardization program carries the endorsement of all major manufacturers in this field whose affirmative opinions are a matter of record.

The majority of major oil company executives recognize the benefits to be derived from such a Program, as indicated in the NPN Survey.

The achievement of such a Program is nothing new—it has been done before. An example is the packaging standardization program affected by the Oil Industry on household insecticides.

If we may assume then, that the majority of manufacturers in the Industries concerned are favorable to such a Program, it remains only for these Industries to create a panel of representatives to work with the A. S. A. and the National Bureau of Standards to make this vitally needed program a reality.

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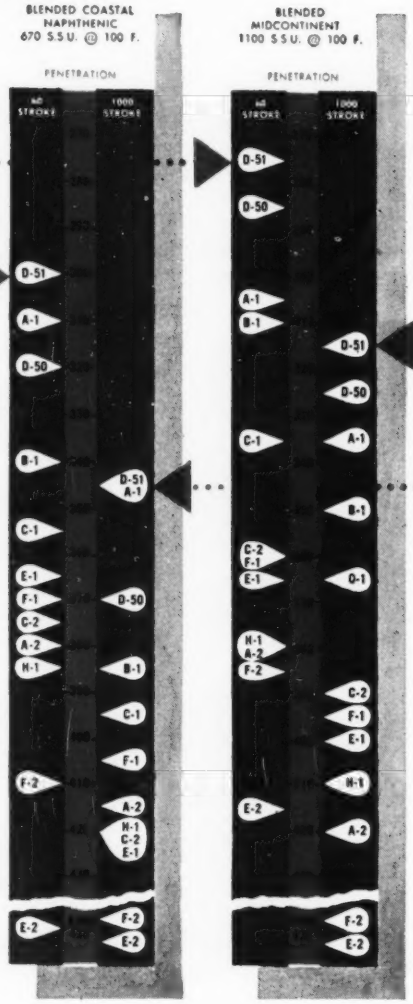

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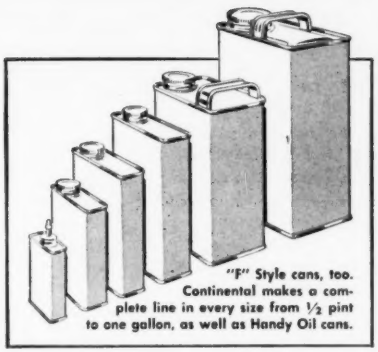
Remember, Continental is the largest producer of utility containers in the United States.



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This article represents a departure from those normally published in The Institute Spokesman. The opinions expressed are those of the author and are not necessarily concurred in by the editor. It is hoped the opinions of the author on this controversial subject may be useful in stimulating interest among those responsible for application of lubricants to wheel bearings. Response from readers is solicited.

IS Wheel

THE ANSWER to that question is yes, but for various reasons there are entirely too many wheel bearing grease complaints. This isn't true of just one grease manufacturer, but we sincerely believe it is true for all suppliers. If a company is not having wheel bearing grease complaints it either isn't selling any grease, or its customers are unusually reticent.

Conscientious grease manufacturers are probably spending more money on research, per pound of lubricant sold, on wheel bearing grease than on any other lubricant. If sales of wheel bearing grease had to support the entire cost of research and the investigation of complaints, we doubt that most of us could afford to sell the product—at least at current competitive prices.

Now out of all this research on wheel bearing grease, someone is going to evolve the perfect wheel bearing grease. It will run 10,000 hours in the CRC wheel bearing tester, be heat proof, water proof, oxidation proof, vermin proof, and wear proof—and when applied in the field, the complaints may drop off as much as 10%.

THE NATURE OF GREASE COMPLAINTS

What are the grease complaints? In the probable order of their frequency they are:

1. Grease runs out of bearing
2. Bearings fail prematurely
3. Complaints regarding grease appearance—
   - Grease too stringy
   - Grease not stringy enough
   - Grease too soft
   - Grease too hard
   - Grease too light in color
   - Grease too dark in color
   - Grease releases too much oil
   - Grease does not release enough oil
   - Grease smells.

An informal survey of grease suppliers' complaint departments indicates that No. 1 is by far the most prevalent complaint.

VARIATIONS IN MANUFACTURER'S RECOMMENDATIONS

Why do these complaints happen? Actually, there are many reasons. One, of course, is the confusion between manufacturers in their description of grease to use, recommended mileage intervals, and recommended packing methods. Following is a summary of wheel bearing grease recommendations from Owner's and Shop Manuals of leading passenger car, truck or bus, and bearing manufacturers.

RECOMMENDED FRONT WHEEL BEARING LUBRICATION INTERVAL

PASSENGER CARS

1 Manufacturer* recommends 5,000 miles.
1 Manufacturer recommends 6,000 miles.
13 Manufacturers recommend 10,000 miles.
1 Manufacturer* recommends no periodic lubrication.

**The manufacturer recommending the shortest service mileage uses the identical bearing assembly as the manufacturer who recommends that no periodic lubrication is necessary.*

TRUCKS AND BUSES

1 Manufacturer recommends 6,000 miles.
12 Manufacturers recommend 10,000 miles.
1 Manufacturer recommends 12,000 miles.
1 Manufacturer recommends 18,000 miles.
1 Manufacturer recommends 60,000 miles.
1 Manufacturer recommends 75,000 miles.

BEARING MANUFACTURERS

A Ball Bearing Manufacturer—"Front Wheel Ball Bearings once correctly adjusted and lubricated require no attention whatsoever unless the front hub is removed for other service work."

A Roller Bearing Manufacturer—"It is usually not necessary to lubricate wheel bearings oftener than twice a year."

Bearing Lubrication PROGRESSING?

by H. L. HEMMINGWAY
The Pure Oil Company

RECOMMENDED AMOUNT OF GREASE FOR FRONT WHEEL BEARING LUBRICATION
PASSENGER CARS

1 Manufacturer recommends 2 tablespoons per wheel.
5 Manufacturers recommend 2½ ounces per wheel.
1 Manufacturer recommends 4 ounces per wheel.
Other manufacturers either do not specify amount or caution against over-lubrication.

TRUCKS AND BUSES

1 Manufacturer says pack bearings, fill hubs half full, pack hub caps.
1 Manufacturer says fill front wheel hub end cavity ½ full.
3 Manufacturers say fill hub to level of bearing cup's smallest diameters.
Other manufacturers do not recommend amount or caution against over-lubrication.

BEARING MANUFACTURERS

A Ball Bearing Manufacturer—"Pack ball and separator assemblies full . . . but do not put grease in hub. Excess grease simply increases chances of leakage into the brakes."
A Roller Bearing Manufacturer — "Bearings should be thoroughly cleaned and repacked with new grease, care being taken to work the grease well into the spaces around the rollers and cages preferably with a bearing packer. *The hub should be filled two-thirds to three-fourths full.*" (Italic is the author's.)

TYPE OF GREASE RECOMMENDED
FOR FRONT WHEEL BEARINGS
PASSENGER CARS

2 Manufacturers recommend "No. 2 N.L.G.I. Wheel Bearing Lubricant."
1 Manufacturer recommends "Milled sodium soap grease."
1 Manufacturer recommends "High melting point, water resistant wheel bearing lubricant."
4 Manufacturers recommend "Medium, short fiber Wheel Bearing Grease."
1 Manufacturer recommends "A good recommended bearing grease."
Others recommend Wheel Bearing Grease or Lubricant.

TRUCKS AND BUSES

1 Manufacturer says "Use a soft, smooth grease. Fibrous types must not be used."
1 Manufacturer recommends "No. 2 N.L.G.I. Wheel Bearing Grease."
1 Manufacturer recommends "No. 2 N.L.G.I. special fibrous Wheel Bearing Grease."
1 Manufacturer recommends "No. 2 Heavy Duty Wheel Bearing Grease."
1 Manufacturer recommends "No. 2 Wheel Bearing Grease below 90°F., No. 3 above 90°F."
1 Manufacturer recommends "No. 3 N.L.G.I. short fiber Wheel Bearing Grease."
Others recommend "Wheel Bearing Grease or Sodium Soap Grease."

BEARING MANUFACTURERS

A Ball Bearing Manufacturer says "Wheel bearing grease of No. 3 consistency having a sodium or sodium and calcium base."
A Roller Bearing Manufacturer says "For normal applications . . . penetration not heavier than 250 . . . and not softer than 300 penetration at 60 strokes." (App. No. 2 N.L.G.I.) If closure will retain a No. 1 penetration grease it may be used.

TO further confuse the situation, if at the time of lubrication the bearings are discolored, a major supplier of ball bearings says "Discoloration of balls is no cause for removal of bearing parts," while a major supplier of roller bearings says "Such a condition (discoloration) usually requires the replacement of the bearings."

ESTIMATED RELATIVE IMPORTANCE OF LUBRICANT QUALITY AND SKILL IN DIFFERENT LUBRICATION PROCEDURES

Procedure	Estimated Importance of Lubricant Quality	Estimated Importance of Skill	Most Important Skills Required
Changing Crankcase Oil	90%	10%	1. Put oil in right place. 2. Clean containers. 3. Have drain plug in place. 4. Use correct quantity.
Changing Automatic Transmission	75%	25%	1. Same as for crankcase. 2. Know where drain plugs are. 3. Check level with engine running.
Lubricate Chassis	85%	15%	1. Know where fittings are. 2. Know which grease to use. 3. Clean fittings first. 4. Know where excess pressure is harmful.
Lubricate Wheel Bearings	10%	90%	1. Know how to remove wheel. 2. Know how to loosen brakes, if necessary to remove wheel. 3. Know how to remove bearings from wheel. 4. Know how to remove and inspect seals. 5. Know how to wash bearings and hub—AND GET THEM CLEAN. 6. Know how to inspect bearings and replace faulty ones. 7. Know how to pack bearings, keep grease clean, and use just the right amount. 8. Know how to reassemble bearings and seals in hub. 9. Know how to replace wheel without damaging seal. 10. Know how to adjust bearings.

Figure 1

The beginning of a mechanical failure of a roller bearing. The chip removed from the outer race and circulated through the bearing has caused numerous pits in the race and on the rollers which will quickly lead to total bearing failure. This type of failure is occasionally blamed on the lubricant although it would seem to be strictly a metal failure due to fatigue.

To summarize, a careful vehicle operator who studied the manufacturer's recommendations to solve his wheel bearing problems would find that:

1. He should lubricate his bearings anywhere from every 5,000 miles to every 75,000 miles or "no periodic lubrication required."

2. He should just pack the bearing assemblies only or use various additional amounts of grease up to filling the hub cap and packing the hub three-fourths full.

3. He *should* use a fibrous type wheel bearing grease or he *should not* use a fibrous type wheel bearing grease. He should use a No. 1, No. 2, or No. 3 consistency.

4. He should either put the bearings back in if they are discolored, or he should throw them away.

IN view of the fact that front wheel bearing installations are more closely identical, one to another, than almost any other part of an automotive vehicle, it is obvious that the varied recommendations of the equipment manufacturer will only confuse the operator who is trying to solve his wheel bearing lubrication problems.

HIGH DEGREE OF SKILL REQUIRED TO LUBRICATE WHEEL BEARINGS

A second, and very important reason for complaints has to do with the considerable amount of skill required to properly pack wheel bearings. In no other regular automotive lubrication job is so much skill required. In the preceding Table we have tried to show roughly the relative importance of skill and lubricant quality on various lubrication procedures.

Obviously the percentages used in the previous table are arbitrary, but we believe that they indicate fairly the relative importance of skill and lubricant quality in each lubrication service. Because of the complications and skill required in lubricating wheel bearings, many things may adversely affect wheel bearing performance:

1. Seal damaged by dragging on spindle during removal, or seals worn out.

2. Bearings or races damaged by use of excessive force or by being dropped during removal.

3. Bearings not cleaned properly. (Removal of hardened grease and dirt inside of bearing cage is very difficult. Proper cleaning, especially of roller bearings, cannot be accomplished without the use of a hot solvent degreaser or a special wheel bearing washer properly used with clean solvent.)

4. Bearings damaged by spinning with air to dry them.

5. Bearings rusted slightly by not being lubricated immediately after cleaning.

6. Inadequate inspection of bearings and races. (One pit or chip on any roller, ball, or race will ruin the bearing. On roller bearings, especially, it is very difficult to properly inspect the inner race. On any bearing, adequate inspection of all balls or rollers requires time and care.)

7. So-called "brinelling" of bearings during shipment of vehicle.

8. Use of dirty grease. (The writer once investigated a complaint of high wheel bearing wear and found that the grease container, with lid missing, was stored directly underneath a bench grinder.)

9. Use of too much grease in the bearing or hub.

10. Bearing design inadequate for job—leads to early failure.

11. Bearing not actually packed with grease; grease only smeared on bearing. For proper lubrication all the space inside the bearing cage must be filled with grease. It is very difficult to accomplish this without a mechanical bearing packer. To do it by hand on a single roller type truck wheel bearing of about 5" diameter requires about 20 minutes —try it!

12. Buyer insists on use of a very hard grease so that when bearings are carelessly packed grease won't run out on brake linings. (Probably won't run into the bearings either.)

13. Hubs and hub caps filled with grease "for good measure," although grease is obviously wasted, it may cause higher bearing temperatures, and, if seals are inadequate, it will run out on brake linings.

14. Inadequate or improper design of grease seals—nothing to stop loose grease from running out onto linings.

15. Improper bearing adjustment. Mechanics have conflicting ideas on how to do it. Bearing and vehicle manufacturers should provide more consistent and easily followed instructions.

16. Dragging brakes. This causes higher operating temperatures which reduce grease life.

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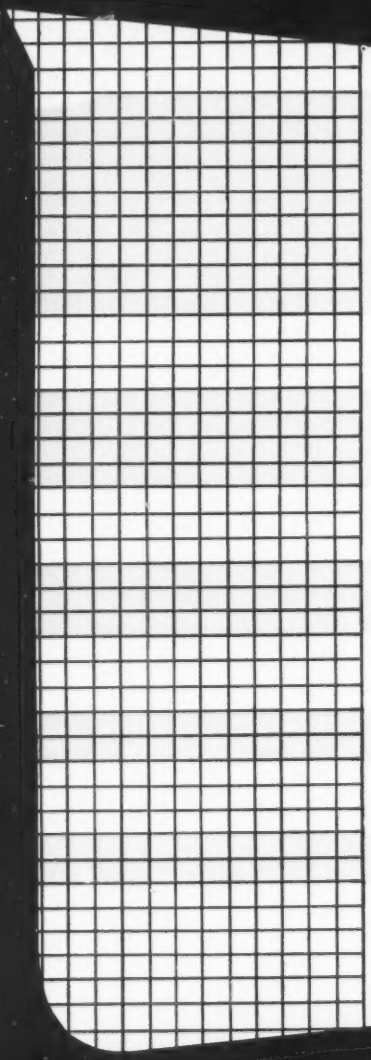

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WHAT ARE YOU GOING TO DO ABOUT IT?

THE troubles encountered in wheel bearing lubrication by vehicle operators and grease suppliers continue. Admittedly, some greases are not as good as the best, and some operators are guilty of faulty maintenance practices, but even with the best grease and good maintenance, wheel bearing failures are experienced and bearing life is sometimes unsatisfactorily short.

Wheel bearing grease quality has improved and will continue to improve. Maintenance and lubrication practices can be improved, if vehicle operators will take the trouble to train their personnel. Most oil companies have dealer training courses on wheel bearing lubrication. In one oil company's lubrication training, each dealer is furnished a 38-step procedure in front wheel bearing lubrication with 29 illustrations. This dealer training course devotes three hours to front wheel bearing lubrication alone.

However, the high percentage of complaints naturally leads to speculation as to whether the basic design itself is right. It hasn't, after all, changed fundamentally in 50 years, in spite of the development of four wheel brakes, and the trend toward higher speeds and higher front wheel loading.

Anti-friction bearings in most rear wheel installations, and in electric motors or other applications are relatively free from the troubles that plague front wheel bearings. Perhaps that is partly the result of the method of lubrication used. Or, perhaps it is the result of rotating the spindle and leaving the outer ring stationary. In this connection, we quote from "Sealed and Shielded Ball Bearing Lubrication Life Forecast and Test Procedure" by Mr. Harry D. Martin, Assistant to Manager of Research & Development of New Departure, p. 18, of the October, 1950, *Institute Spokesman*:

> "Available experience indicates that outer ring rotation affects grease life to a greater extent than does inner ring rotation, particularly at high operating temperatures. . . . Grease life may be less than one half that for inner ring rotation where outer ring rotates and the stationary ring temperatures are near 250°F. and speeds are moderate to high."

The conditions of outer ring rotation in automotive front wheel bearings seem to match those just described that reduce grease life by one half. Offhand, redesign for inner (instead of outer) ring design does not seem to present any formidable obstacles. In fact, figure 2 shows a design in actual use on a grain combine. Figure 3, a typical automotive design with rotating outer ring is shown for comparison. Figure 4 shows the rotating spindle design of Figure 2 with the brake assembly of Figure 3 superimposed.

Such a change in design would appear to permit definite improvements in bearing and lubricant life. It would have the disadvantage of reduced accessibility, but this might be compensated by the fact that attenion would be required less frequently.

There are undoubtedly other ways to improve the design. Let us hope they will be forthcoming.

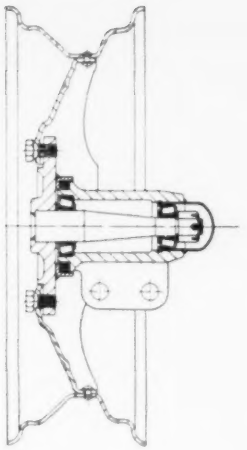


Figure 2

A wheel bearing design used on a farm implement. The design here differs from the usual automotive practice in that the hub remains stationary and the spindle rotates with the wheel.

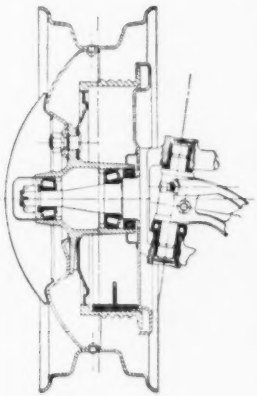


Figure 3

A typical automotive front wheel bearing design of the type that has been used for many years. The spindle remains stationary while the outer ring or hub rotates.

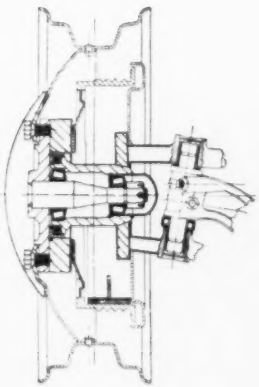
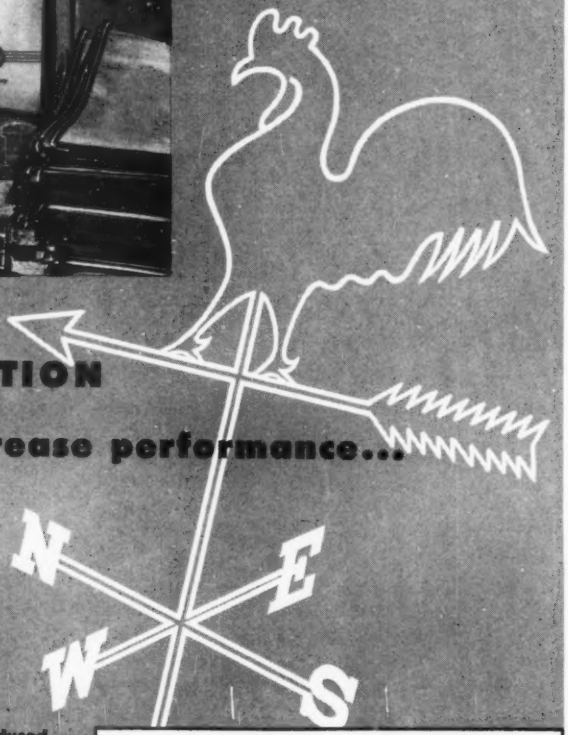


Figure 4

A possible automotive design in which the spindle rotates with the wheel and the hub is stationary. Would this design make the job of a wheel bearing lubricant easier?



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Technical Committee Column

Chairman T. G. Roehner, Director of the Technical Service Department, Socony-Vacuum Laboratories

It will be recalled that at the 1950 Chicago meeting the Subcommittee on the Procurement of Technical Papers for Publication in The Institute Spokesman was given the assignment of preparing a guide for authors of papers to be presented at the annual meetings and for publication in The Institute Spokesman. Mr. C. J. Boner, of Battenfeld Grease & Oil Corporation, 3148 Roanoke Road, Kansas City 8, Mo., is Chairman of that Subcommittee and has submitted a report which has been given to the Board, particularly to Mr. G. E. Merkle, of Fiske Brothers Refining Company, 129 Lockwood Street, Newark 5, N. J., Chairman of the Program Committee, for the next Annual N.L.G.I. Meeting. It is proposed to publish this guide in the form of a booklet, similar to that issued by other technical organizations. There is still time for any one to offer comments on material for the booklet to either Charlie Boner or George Merkle.

One of the active subcommittees of the ABEC-NLGI Cooperative Committee on Grease Test Methods is the Subcommittee on High Pressure Greasing Equipment. Mr. J. M. Bryant, of Link Belt Company, 519 N. Holmes Avenue, Indianapolis 6, Ind., Chairman, held a meeting of this Subcommittee on April 13 in Pittsburgh, Pennsylvania. A review of the minutes of that meeting confirmed the conclusion that a valuable service will be done by focusing attention on the precautions which should be observed to prevent overpacking of bearings when high pressure greasing equipment is used. The Subcommittee is fully aware of the fact that there are a number of phases of the problem which should be considered if all interests are recognized. Accordingly, they have divided the problem into three groups. Mr. C. F. Raisch, of Stewart-Warner Corporation, 1826 Diversey Parkway, Chicago 14, Illinois, has one group who will assemble available information involving greasing equipment. Mr. Bryant has another group who will handle the bearings and seal angles, while Mr. P. R. McCarthy, of Gulf Research & Development Company, P. O. Drawer 2038, Pittsburgh 30, Pa., is leader of the third group who will submit data from the lubricating grease angle. More particularly, the grease gun group will develop details regarding pressure relief devices, their design, installation and maintenance. The bearing group will provide data on bearing designs which have been damaged by grease pressure, and sketches of various means for relieving grease pressure in bearings. The contribution from the lubricating grease group will include details on cases in the field where this type of trouble was experienced. They will also present data regarding the effect on the lubricating grease of operation in overpacked bearings. All of the members named above will welcome assistance. Their addresses have been given in order to facilitate sending your comments or data to them.

HAVE YOU MADE YOUR RESERVATION?

"CHICAGO IS REALLY LUCKY THIS YEAR--- THEY HAVE THE WHITE SOX AND THE N.L.G.I ANNUAL MEETING OCT. 29, 30, 31!"

Patents and Developments

SILOXANE GREASES

Lubrication of moving parts operating at high or low temperatures has always presented difficult or insoluble problems. Greases prepared from polysiloxanes and lithium stearate represent an improvement over the organic greases for high temperature lubrication, but they too have some undesirable properties.

Recently, Dow-Corning Corporation, according to its U. S. Patent No. 2,551,931, produced desirable greases from liquid organo polysiloxanes and a minor amount of a metal salt of an alicyclic substituted fatty acid. The polysiloxanes are polymers composed of alternate silicon and oxygen atoms wherein the silicon atoms may be variously substituted with certain organic radicals. It is preferred to have each silicon atom attached to 1-3 organic radicals, and there should be an average of 1.9 - 2.5 organic radicals per silicon atom.

The thickener for the polysiloxane is a metal salt of an alicyclic substituted fatty acid having a chain length of 2-6 carbon atoms, such as cyclohexylacetic, butylcyclohexylacetic, 2-cyclohexenecaproic and pentalaneacetic.

These greases are claimed to be extremely stable at both high and low temperatures. They possess melting points in excess of 600°F and exhibit a bleed of less than 1% when heated at 150°C for twenty-four hours. Bearings lubricated with the products have been operated in excess of two thousand hours at a speed of 1750 rpm and temperatures of 175°C without showing any signs of failure. Samples heated at 200°C for twenty-four hours are claimed to have shown no change.

In one example, a phenylmethylpolysiloxane was used, containing dimethyl and trimethylsiloxane units so that the degree of substitution of the copolymer was 2 to 2.1 organic radicals per silicon atom. A solution of 5 g. of lithium hydroxide in 20 g. of water was added with agitation to a solution of cyclohexylcaproic acid in 20 g. of a 100 C.S. phenylmethylpolysiloxane of the above composition. The addition of the hydroxide solution was carried out at a temperature of 80°C. After all the hydroxide had been added, the temperature was raised to 100°C to evaporate the water. Then 60 g. more of the copolymer was added with stirring to the residue which was being maintained at 100°-120°C. Thereafter, the material was heated to about 200°C for one hour, cooled and milled on a 3-roll mill. The grease so obtained melted about 315°C and had an alkaline number of 8.96. This grease underwent no change after twenty-four hours heating at 200°C.

Table I lists the melting points of the greases made with the lithium salts of the various acids, according to the example given above.

SULFONATE GREASES

It has been already suggested (in Reissue Patent 23,082) to produce greases of high dropping point by thickening a mineral oil with a so-called Werner complex formed from a petroleum sulfonate and a salt of a low molecular weight carboxylic acid such as acetic acid. In this case, the two ingredients were disclosed as being in the molar ratio of 1:1.

It has been found, according to Standard Oil Development Company's patent 2,553,422, that under conditions of extreme shear, such greases do not perform satisfactorily, and their oxidation resistance is low, even when antioxidants are added. This latter patent describes production of an improved grease by incorporating into the lubricating oil a mixture containing 45 - 72% of an alkaline earth metal sulfonate which is soluble in the oil, having an acid radical weight of between 300 and 500, together with 28 - 55% of a salt of a low molecular weight aliphatic carboxylic acid. A modifier such as a partially esterified polyhydric alcohol (sorbitan trioleate) also may be added to the extent of a few percent.

TABLE I

Acid	M. P., °F., of grease	Alkaline No. of grease
Cyclohexyl acetic	600	6.56
cyclohexyl propionic	515	3.92
cyclohexyl butyric	487	3.76
cyclohexyl valeric	>600	15.9
alpha butylcyclohexylacetic	>600	12.15
gamma ethylcyclohexylbutyric	>600	17.14
alpha 4 diterbutylcyclohexylbutyric	600	25.7
alpha 4 disecbutylcyclohexylbutyric	535	27.5
2 cyclohexenecaproic	455	4.54
pentalaneacetic	>600	7.82
cyclopentylvaleric	430	.....
20% cyclohexyl butyric 80% cyclohexyl caproic	460	1.61

GREAS-EVENTS

Here is a feature you can reproduce in your own publication. An electro can be made from this drawing to fit your particular page. Tell the story of your industry in picture form.

A suitable grease is described as containing 10% strontium sulfonate (450 molecular weight), 2% of a partially esterified-polyhydric alcohol modifier, a Coastal distillate (500 SSU at 100°F, 55 SSU at 210°F) and 6% calcium acetate (molar ratio of 6.25 to 1 acetate to strontium sulfonate).

Another Standard Oil Development Co. patent (2,553,423) discloses that the major weakness of greases of the sulfonate-low molecular weight salt complex type is their tendency toward lack of mechanical stability. A particular advantage was found to lie in combining a mixture of sulfonates, at least one of which has a combining (sulfonate radical) weight below 400 (say 350 - 380), and another above about 400 (say 420 - 500). These are preferably combined in about equal quantities, with choice of sulfonates being sodium first, calcium second and strontium third.

One suitable grease formulation contained 9.25% sodium salt of mahogany acid (mol. wt. 375), 9.25% sodium salt of mahogany acid (mol. wt. 425), 74% Coastal mineral oil (40 SUS at 210°F), and 7.5% calcium acetate. This composition had a dropping point of 371°F.

ARTICLES

A new Army "all temperature" grease (Spec. No. MIL-G-10924-ORD) was developed for use on all Army vehicles and artillery pieces. The new lubricant is claimed to perform equally well in tropic heat or Arctic cold, and to allow immediate shipments of vehicles to the Arctic zone with the changing only of engine oils and gear luubricants. Previously, thirty man-hours were needed for the conversion (Nat. Petr. News 5/16/51, p. 32).

Lubrication of Conveying Machinery—Oil Power, 3-4/51, p. 10. Describes grease lubrication.

Rheological properties of a lubricating grease—Singleterry et al. Bibl. of Tech. Repts. 4/13/51, p. 105.

PATENTS

Brit. Pat. 654,084 (*Shell Oil*)—

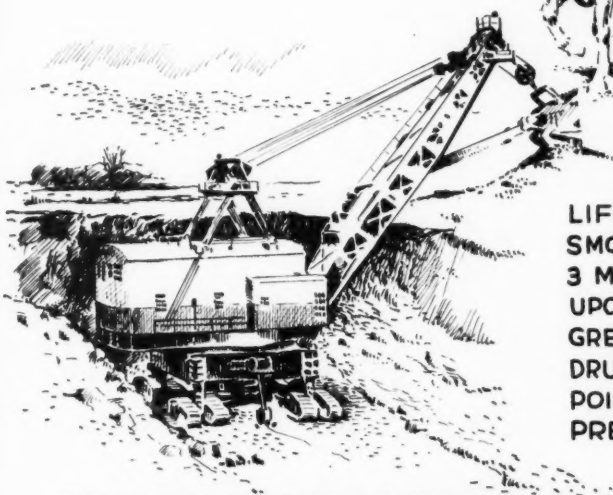
Manufacture of lubricating grease.

GREAS-EVENTS

STRIP MINING

A SCOOP

AND PLENTY OF FRICTION – EARLY STRIP MINING.



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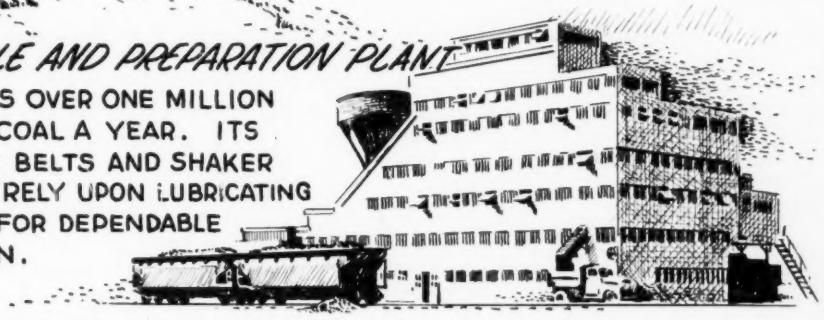

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Superior mechanical stability
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Exceptional oxidation stability
Resistance to water

It all adds up—to more efficient lubrication . . . much lower inventory and application cost . . . *fewer* applications per year.

The Shell Lubrication Engineer will be glad to study your lubrication requirements, and to advise how you can enjoy the economies that many plants are now getting through use of this cost-cutting grease.

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Frank X. Sieloff

ELCO NAMES SIELOFF SALES MANAGER

Appointment of Frank X. Sieloff as Sales Manager of The Elco Lubricant Corporation of Cleveland, Ohio is announced by J. E. Reagan, President.

Sieloff, after receiving a B.E. degree in Chemical Engineering from the University of Toledo, entered the U. S. Navy serving as Engineering and Executive Officer aboard a Destroyer Escort. Upon discharge, he accepted a position with the Packard Motor Car Corporation and worked on the development of jet aircraft engines. He left Packard to enter the Sales field and has been a sales engineer with Elco since 1949.

C. W. LUTZ NAMED DIRECTOR OF PURCHASES FOR GULF OIL CORPORATION

Cedric W. Lutz has been appointed Director of Purchases for Gulf Oil Corporation, effective July 1, the company announces. Mr. Lutz has been serving as assistant to the Vice-President in the Houston Production Division.

In his new capacity, Mr. Lutz will be in charge of all purchases made in the United States by all Gulf companies, and will be responsible for determining purchasing policies and procedures for all the companies' domestic divisions and districts.

A native of Arizona, Mr. Lutz attended the University of Arizona and University of Southern California from which he received a B.A. degree. After several years as a teacher and principal in Arizona schools, he enrolled in the Harvard School of Business Administration, being graduated with an M.B.A. degree and later teaching at that school.

Prior to coming with Gulf, Mr. Lutz had a varied purchasing experience in one of the nation's large industrial companies where he served for twelve years. In the past several years his work in the Houston Production Division has familiarized him with the production problems of the company.

Mr. Lutz, who will make his headquarters in Pittsburgh, succeeds Mr. Lee C. Bock, General Purchasing Agent, who died earlier this year.

Stewart W. Varn

INLAND STEEL MAKES VARN ASSISTANT TO VICE-PRESIDENT IN CHARGE OF SALES

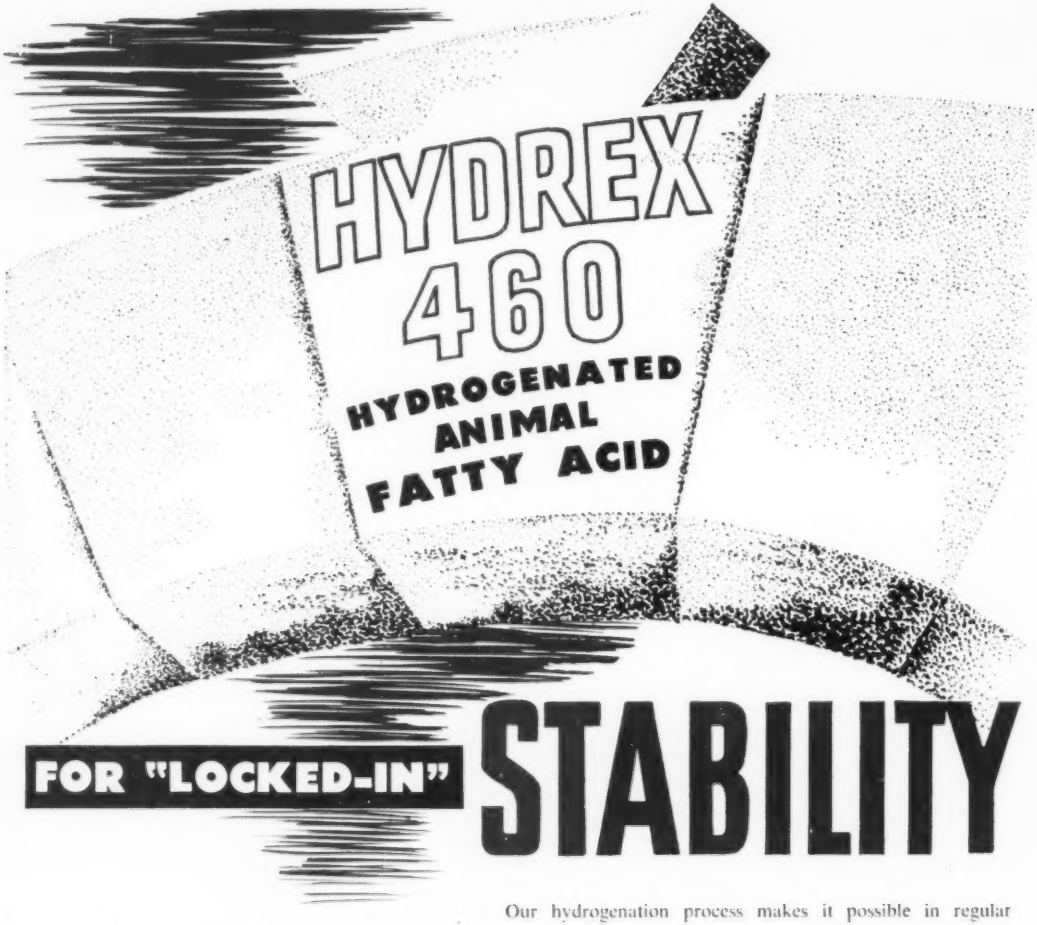
Stewart W. Varn has been appointed to the position of Assistant to the Vice-President in Charge of Sales of the Inland Steel Container Company.

Mr. Varn has had broad experience in many fields which have given him a background for work in the steel container industry.

Prior to the last war he was Vice-President and Sales Manager of Kuehne Chemical Company. For two years during the war he served in the Chemical Division of the War Production Board where his constructive work was recognized by the industry. Following this he owned his own Export-Import Company and did considerable traveling in South America. He was recently Sales Manager of the Pigment Division of Metals Disintegrating Company.

According to Gordon D. Zuck, Vice-President in Charge of Sales, Mr. Varn's duties will consist principally in the establishment of better and more effective co-ordination of all sales activities of the company.

The Inland Steel Container Company, a leading manufacturer of steel drums and pails, has its main office and plant in Chicago and other plants in New Orleans and Jersey City.



FOR "LOCKED-IN" STABILITY

Our hydrogenation process makes it possible in regular production runs to reduce the proportion of unsaturated compounds to a minimum . . . greatly improving the stability of the fatty acid *and the end product.*

For example, Hydrex 460 Hydrogenated Animal Fatty Acid is a water-white, stable, saturated fatty acid that is relatively rich in stearic acid (about 70.0%), with about 30% palmitic acid and practically free of oleic acid. Yes, with our hydrogenation technique, we are producing high melting point, low iodine value fatty acids with controlled composition. Manufacturers of fatty acid esters, metallic stearates, special lubricants and other products where *stability* is essential, should investigate medium-priced Hydrex 460 Hydrogenated Animal Fatty Acid.

HYDREX 460 SPECIFICATIONS

Titre	(134.6-140.0°F) 57.0-60.0°C
Color 5¼" Lovibond Column (max)	4 Yellow-0.4 Red
Iodine Value (Wijs)	1-4
Free Fatty Acid (as oleic)	100-103%
Acid Number	199-205
Saponification Value	201-207

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CHESNEY TO MANAGE DEEP ROCK REFINERY

Robert M. Chesney became manager of Deep Rock Oil Corporation's refinery at Cushing, Oklahoma, July 1, William J. Carthaus, vice president in charge of the company's manufacturing and research division has announced in Tulsa. He fills the position recently vacated when K. O. Stowell resigned.

Associated with the oil industry in various capacities since 1934, Chesney brings to Deep Rock wide experience in refinery management, processing and petroleum chemistry. He received his B.S. degree in chemical engineering from the University of Delaware in 1932 and did additional study at Temple University.

He began his working career with Socony-Vacuum Oil Company as chemist in 1934. Successively he was assistant foreman and process engineer until he became a foreman with the company in 1940. From 1940 until 1949, he progressed through the positions of general foreman, process supervisor, assistant to the general manager and assistant refinery superintendent. In 1949 he became superintendent of Socony-Vacuum's second largest refinery which is located at Paulsboro, N. J., and has a throughput of 70,000 barrels a day.

He has been active in his local Rotary club chapter, church council, company activities and sports. He and Mrs. Chesney will establish residence in Cushing during the summer.

DEEP ROCK PROMOTES BENEDICT

Dale Benedict, Oklahoma and Midcontinent landman since 1925, was named assistant manager of Deep Rock Oil Corporation's land department succeeding L. M. Swayze, recently resigned, according to an announcement by John L. Ferguson, vice president of Deep Rock's land and exploration division.

Although a native of Kansas, Mr. Benedict has been living and working in Oklahoma since 1916. He attended the University of Oklahoma, then began land work in the Southwest with Tide Water Associated Oil Company. Since that time, he has gained wide experience in all phases of oil land matters. He is a member of the Tulsa Landmen's Association and the Petroleum Club.

He resides with Mrs. Benedict and a daughter at 164 E. 29th Pl. in Tulsa.

FUTURE MEETINGS of Your Industry

JULY, 1951

19-20 Western Petroleum Refiners Assn. (regional meeting), Broadview, Wichita, Kansas.

AUGUST, 1951

13-15 Socy. of Automotive Engineers, Inc. (West Coast meeting), Olympic Hotel, Seattle, Wash.

17 Western Petroleum Refiners Assn. (regional meeting), Leonard Refineries Auditorium, Alma, Mich.

21-24 National Congress of Petroleum Retailers (5th annual session), Hotel Sherman, Chicago, Ill.

SEPTEMBER, 1951

3-7 American Chemical Society (120th national Diamond Jubilee meeting), Hotel Statler, New York, N. Y.

5-8 Oil Industry Information Committee, Waldorf - Astoria Hotel, New York, N. Y.

6-7 Michigan Petroleum Assn. (annual fall convention), Ramona Park Hotel, Harbor Springs, Mich.

8-9 International Union of Pure and Applied Chemistry (16th conference), Hotel Statler, New York, N. Y.

10-13 International Congress of Pure & Applied Chemistry (12th conference), Hotel Statler, New York, N. Y.

10-13 Socy. of Automotive Engineers, Inc. (national tractor meeting and production forum), Hotel Schroeder, Milwaukee, Wisc.

12 American Petroleum Institute (Lubrication Committee business meeting), The Traymore, Atlantic City, New Jersey.

12-14 National Petroleum Assn., Hotel Traymore, Atlantic City, N. J.

14-15 International Union of Pure and Applied Chemistry (16th conference), Hotel Statler, Washington, D. C.

14-16 Petroleum Marketers Assn. of Texas (second annual convention), The Shamrock, Houston, Texas.

20-21 Western Petroleum Refiners Assn. (regional meeting), Henning Hotel, Casper, Wyo.

24-25 American Assn. Oilwell Drilling Contractors (11th annual meeting), Hotel Texas, Fort Worth, Texas.

24-26 American Socy. of Mechanical Engineers (6th petroleum mechanical engineering conference), Mayo Hotel, Tulsa, Okla.

24-26 Independent Oil Compounders Assn., (4th annual meeting), Hotel Detroit-Leland, Detroit, Michigan.

25-28 The American Socy. of Mechanical Engineers (fall meeting), The Radisson, Minneapolis, Minn.

OCTOBER, 1951

3-6 Socy. of Automotive Engineers, Inc. (national aeronautic meeting, production forum, and aircraft engineering display), The Biltmore Hotel, Los Angeles, Calif.

8-9 Texas Mid-Continent Oil & Gas Assn. (annual meeting), Hotel Beaumont, Beaumont, Texas.

8-10 The American Oil Chemists' Socy. (fall meeting), Edgewater Beach Hotel, Chicago, Ill.

8-12 National Safety Council (39th national safety congress and exposition), Stevens Hotel, Chicago, Ill.

13-14 Indiana Independent Petroleum Assn. (fall convention), Hotel Severin, Indianapolis, Ind.

14-20 Oil Progress Week.

22-23 Independent Petroleum Assn. of America (annual meeting), The Shamrock, Houston, Texas.

22-24 American Standards Assn. (33rd annual meeting and national standardization conference), Waldorf-Astoria, New York, N. Y.

29-30 Socy. of Automotive Engineers, Inc. (national diesel engine meeting), The Drake, Chicago, Ill.

29-31 Socy. of Automotive Engineers, Inc. (national transportation meeting), Knickerbocker Hotel, Chicago, Ill.

29-31 N.L.G.I. (annual meeting), Edgewater Beach Hotel, Chicago, Ill.

31 to Nov. 1 Socy. of Automotive Engineers, Inc. (national fuels and lubricants meeting), The Drake, Chicago, Ill.

NOVEMBER, 1951

3-8 Oil Industry Information Committee, Stevens Hotel, Chicago, Ill.

5-8 American Petroleum Institute (31st annual meeting), Palmer House, Chicago, Ill.

5-8 A. P. I. Lubrication Committee, Chicago, Illinois.

25-30 The American Society of Mechanical Engineers (annual meeting), Chalfonte-Haddon Hall, Atlantic City, N. J.

26 to Dec. 1 23rd Exposition of Chemical Industries, Grand Central Palace, New York, N. Y.

DECEMBER, 1951

2-5 American Inst. of Chemical Engineers (annual meeting), Chalfonte-Haddon Hall, Atlantic City, N. J.

3-4 Chemical Specialties Mfrs. Assn. (38th annual meeting), The Mayflower, Washington, D. C.

26-31 American Assn. for the Advancement of Science (annual meeting), The Bellevue-Stratford, Philadelphia, Pa.

★

JANUARY, 1952

14-18 Socy. of Automotive Engineers, Inc. (annual meeting), Hotel Book-Cadillac, Detroit, Mich.

FEBRUARY, 1952

4-6 Missouri Petroleum Assn. (annual convention and trade exhibit), Jefferson Hotel, St. Louis, Mo.

19-21 Iowa Independent Oil Jobbers Assn. (annual convention), Fort Des Moines, Des Moines, Iowa.

MARCH, 1952

3-5 Mfrs. Standardization Socy. of Valve & Fittings Industry(annual meeting), Hotel Commodore, New York, N. Y.

12-13 Texas Oil Jobbers Assn., Inc. (annual spring convention and refiners & suppliers exhibit), Hotel Adolphus, Dallas, Texas.

11-14 National Assn. of Corrosion Engineers (annual conference and exhibition), Municipal Pier and Galvez Hotel, Galveston, Texas.

LUBRICATE FOR SAFETY
- EVERY 1,000 MILES -

Your Industry NEWS

May 21st, 1951

To The Third World Petroleum Congress
The Hague

Greetings:

On behalf of the lubricating grease industry of the United States of America, the National Lubricating Grease Institute salutes the Third World Petroleum Congress, meeting in The Hague this summer of 1951.

As a segment of the petroleum industry in America the manufacturers and marketers of lubricating greases share the interests and aspirations which inspire the convening of this Congress. It is therefore with true sincerity that the National Lubricating Grease Institute extends its profound wishes that the Third World Petroleum Congress will be blessed with success and accomplishment in furthering the progress of petroleum as a factor in world improvement and international peace.

Howard Cooper, President
National Lubricating Grease Institute

The above greeting from the N.L.G.I. was presented on May 31 to The Third World Petroleum Congress in The Hague by Frank M. Porter, President of the A.P.I.

INDUSTRY PROGRESS AND PROBLEMS REPORTED AT GULF OIL'S LARGEST PRODUCTION ENGINEERING CONFERENCE

Reviewing the problems and current progress in recovering more oil from the world's petroleum reservoirs, Gulf Oil Corporation held the sixth and largest Production Engineering Conference in its history during the week of June 18-22 at Hotel William Penn in Pittsburgh, Pennsylvania.

Approximately 250 engineers, research scientists, technicians, and officials of the Company attended. Represented were all Company producing divisions in the United States, Canada, South America, Europe and the Middle East. Some 170 came from out-of-town to the meetings.

Those attending heard 30 technical papers presented at seven technical sessions, took part in related discussions and conferences, inspected current research projects at the Gulf laboratories, Harmarville; and viewed production facilities at the Jones & Laughlin Steel Corporation's Aliquippa plant, Westinghouse Electric Corporation's East Pittsburgh plant, and Parkersburg Rig & Reel Co., Parkersburg, W. Va.

The major emphasis of the Conference was given to problems of lost circulation and squeezing more production from existing fields.

WITCO SALESMEN INSPECT PLANTS

In order that Witco carbon black salesmen may better understand the production of the products that they distribute, Mr. Max A. Minnig, Sales Manager of the Carbon Black Division of Witco Chemical Company, took a party of twenty on a tour of inspection through the Continental Carbon Company's plants in Amarillo and Sunray, Texas, the Barnhart Hydrocarbon Corporation's plant in Big Lake, Texas, and the Continental Oil Black Company plant in Lake Charles, Louisiana.

They flew to Texas May 30th, after inspecting the newly enlarged Witco Chemical Company plant and laboratory in Chicago. They returned to Chicago June 3rd.

NOPCO 15-YEAR CLUB INDUCTS 23 MEMBERS

In a ceremony at the Harrison, N. J., home office and plant, 23 employees were inducted into the Nopco 15-Year Club on Monday, May 28, 1951. These employees were awarded a gold service emblem and will receive three weeks vacation (instead of the customary two) each year from now on.

The group includes: Drs. Edwin A. Robinson, Maurice J. Kelley, Messrs. Thomas Groll, Walter Brewer, George Buccarella, James Wilson, William Carlin, Charles Augustine, Alfred Hartley, Joseph Cunder, Richard Griffith, Charles Lighthipe, Norman Menzie, Ferdinand Herpers, Anthony Sellitto, Travis Rankin, Willis Bowman, Alphonse Tino, Robert T. Whelan; Mrs. Lena Christenson, Mrs. Alice Murphy, Mrs. Gladys P. Krauss and Miss Mildred Peterson.

The new members increase the Club's membership to 169, which is 22% of the Company's total personnel.

At this same meeting, solid gold watches were awarded to the following employees who celebrate 25th anniversaries this year: John J. Craven, Leo Cherry, Sam Cherry, Oliver Bryant, Jacob Wolfson, George Kempe, John Farrel, Alfred O. Brookes, Fitzhugh Pearson, William Hill and William Smith.

The awards were presented by Charles P. Gulick, Chairman of the Board.

CITIES SERVICE CAT CRACKER BREAKS INITIAL RUN RECORD

East Chicago Unit Operates Continuously for 785 Days

Cities Service Oil Company's East Chicago fluid catalytic cracking unit has made petroleum processing history by completing a record initial run of 785 days before being shut down this week for its first turn-around.

In the course of its record run, a high tribute to the operating skill and teamwork of the East Chicago refinery group, the Cities Service unit processed into high test gasoline a total of 11,914,000 barrels of virgin gas oil.

At the same time, the company announced that another of its cat crackers, a fluid unit at the Cities Service Lake Charles refinery, is setting an all time record for continuous operation on other than an initial run. This unit has been operating more than 900 days since its last turn-around and is still going strong, the announcement says.

MIDWEST RESEARCH INSTITUTE EXPANDS

Total research volume during the first six months of the fiscal year shattered all previous records, it was reported by Dr. Charles N. Kimball, president of Midwest Research Institute, to the semi-annual meeting of the Board of Governors in Kansas City.

Comparisons with similar periods last year revealed as much as 50% increase in dollar volume for the seven-year-old institution. It is expected that on an annual basis this figure will approach the million-dollar mark!

Kimball explained that this phenomenal growth in sponsored research projects came from three sources; those who had not previously used the Institute's facilities; those organizations which maintain programs and renew them at given intervals; and repeat sponsors, clients who have financed two or more separate programs and have returned for additional work, not necessarily restricted to the initial field of research activity.

An accompanying technical staff growth of 29% over previous employed scientific personnel marked this period as one of the most formative in the Institute's history. These staff additions provided new skills for clients and made available new fields of specialization for an expanding variety of sponsors.

The Institute president cited as an example of this the petroleum research laboratory which is now in operation at the Institute and is specially equipped for extensive investigations in the field of high temperature reactions of gaseous hydrocarbons.

Another important result of the expanded scope of Institute operations was the formation of a Chemical Engineering division, to be operated in addition to the already-existing Physics, Engineering and Chemistry divisions.

Representative of the programs under way at the Institute during the first part of the year were design of chemical processing equipment; formulation of specialized waxes and detergent compounds; comprehensive programs in ceramics and minerals; studies of agricultural uses for a mineral; and special mechanical equipment design. These are a few of the programs which were carried out, in addition to the Institute's commitments for national defense and public health.

Kimball predicted increased long-term relations with both present and future sponsors through continued emphasis on significant results from industrial projects, and improved supervision and caliber of research work.

SWAN-FINCH VISCOSITY INDEX DEMONSTRATION KIT

One of the most important properties of high quality petroleum oils—whether they are classed as engine oils, gear oils, hydraulic oils, turbine oils, or spindle oils, is their relative ability, termed Viscosity Index, to resist changes in "body" with changes in temperature.

Moreover, as this physical property of oils has a direct bearing on the overall mechanical efficiency of the units in which they are used, considerable energy and money have been expended in developing not only methods to improve an oil's V.I. but also in devising a rather simple mathematical formula for determining and rating an oil's Viscosity Index. Present formula employed by the petroleum industry was developed by Dean & Davis. Nomographs and tables have also been prepared from this formula and the accumulated data whereby an oil's V.I. can be more quickly ascertained knowing its viscosity at 100°F. and 210°F.

However, in the use of this method for discussion purposes a certain amount of experience in petroleum technology is presupposed, and without visual demonstration or proof it is quite difficult for the average layman to fully comprehend.

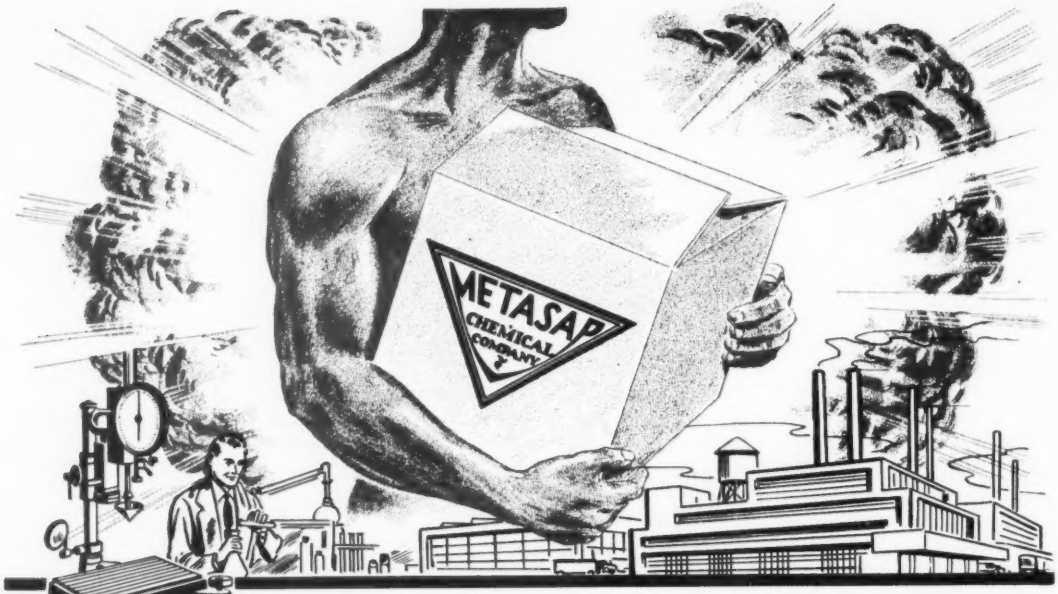
To supplement a discussion on V.I. Characteristics of Oils, a colorful Viscosity Index Demonstration Kit has been devised whereby the viscosity-temperature characteristics of a low V.I. SAE 90 gear oil have been compared with those of a high V.I. SAE 90 gear oil, by three visual methods, viz.:

1. A.S.T.M. Standard Viscosity-Temperature Chart.
2. Bar Charts.
3. Modified Falling-Ball Viscosimeters.

On the A.S.T.M. Chart the two oils selected have the same viscosity @ 100°F. and special note is made to their viscosities at 30°, 70° and 210°F. Attention is also called to a Low Temperature Area for operating conditions below 100°F. and a High Temperature Area for operating conditions above 100°F. because of the general nature of the field problems experienced in these temperature regions. The A.S.T.M. Chart has also been used to authenticate the viscosities of the oils used in the actual oil demonstration (Modified Falling-Ball Viscosimeters). The Bar Charts on the two wings illustrate the difference in viscosities graphically at the four temperatures and tie in the field problems experienced with low V.I. gear oils during high and low temperature operations.

A most effective method for demonstrating the differences in viscosities between two oils at the same temperature is the Modified Falling-Ball Method. To simplify this demonstration, special oils, whose viscosities at room temperature (70°F.) would be equivalent to the two gear oils at 30°F., 70°, 100° and 210°F., were prepared and sealed in tubes with ¼" steel balls. Standard ¼" aluminum balls were used in the two low viscosity oils for greater effectiveness.

In conducting the demonstration, all that is necessary to illustrate the difference in viscosities at any definite temperature is to extricate the respective oil tubes from their clips and invert them together quickly. Should the balls drop too quickly, their rate of fall can be slackened by holding the tubes together at a 45° angle. This is suggested for the low viscosity oils particularly. It will be observed that the higher viscosity oils offer greater resistance to the ball's movement and that the high V.I. gear oil has a lower viscosity at 30° and 70° and a higher viscosity at 210°F. than the low V.I. gear oil.



"Pass the Ammunition!"

. . . that's the "order of the day" as America once again turns to national defense. "Ammunition" in the form of innumerable products required to build and maintain a war machine *and* fill the needs of a vigorous peace economy, too. "Ammunition" in the form of *grease*—at the head of the roster, since without lubrication modern equipment cannot operate.

Metasap* takes particular pride in its ability to help the lubricant manufacturer meet *every specification*—produce the best possible grease for *any grease job.*

Metasap Aluminum Stearates, for example, offer a versatile means for achieving any effect desired in a finished product:

METASAP 537 gives No. 3 consistency and a short feather;

METAVIS* 543 gives any degree of stringiness desired;

METASAP 587 produces soft, smooth and stable greases with low viscosity oils;

METASAP 540 proves particularly suitable for low viscosity greases;

METASAP Aluminum Stearates R, GM, 537, 590 and 598 provide a group of bases for producing harder greases in the order given.

Whatever your grease requirements, consult with us. Profit by having our experience, specialized knowledge and research facilities help you select *the correct base for any given oil.*

*Reg. U. S. Pat. Off.

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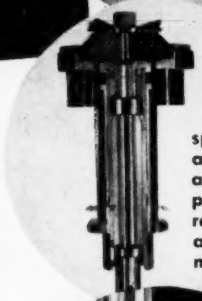
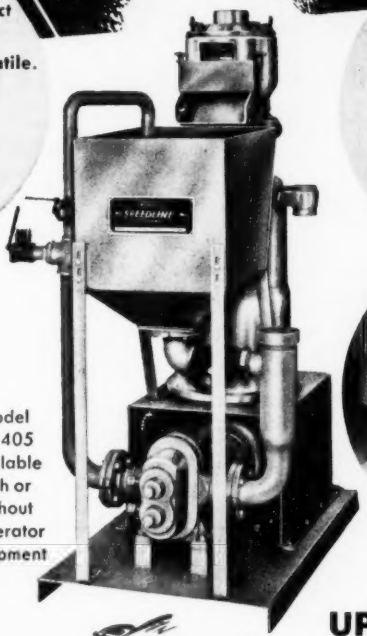
YOU GET MORE WITH MOREHOUSE

Spline driven rotor assembly simplifies maintenance.

20" x 51" —compact and versatile.

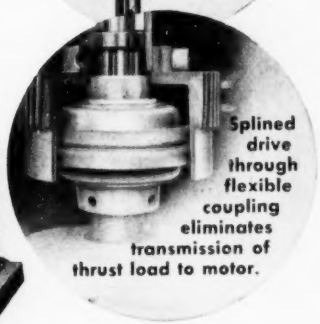


Double-bearing spindle assembly assures positive radial alignment.



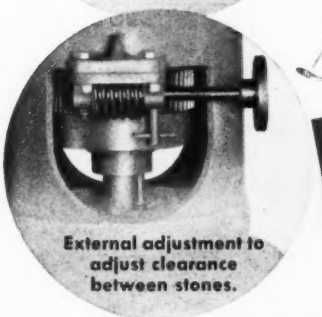
Model B-1405 available with or without deaerator equipment

Lightweight head is easy to remove.



Splined drive through flexible coupling eliminates transmission of thrust load to motor.

Polished processing chamber is easy to clean.



External adjustment to adjust clearance between stones.

More production in a fraction of the space at a fraction of the cost.

UP TO 8000 LBS. PER HOUR

Specially designed for processing greases, lubricants and compounds, Morehouse Mill Model B-1405 shown above is capable of producing up to 8000 lbs. per hours—dependent upon formulation. It is highly efficient on nearly all kinds of lubricants and greases, including metallic-soap base and solid additive types.

In addition, the Morehouse principle of high-speed grinding and the accuracy of adjustment possible combine to produce end products of highest quality, superior in appearance and texture. It is available with or without deaerator, for elimination of entrained air if necessary.

There is a model to meet your needs. Volume-for-volume Morehouse Mills cost only a fraction as much as other mills both to purchase and operate. Dollar-for-dollar, they give you more for your money.

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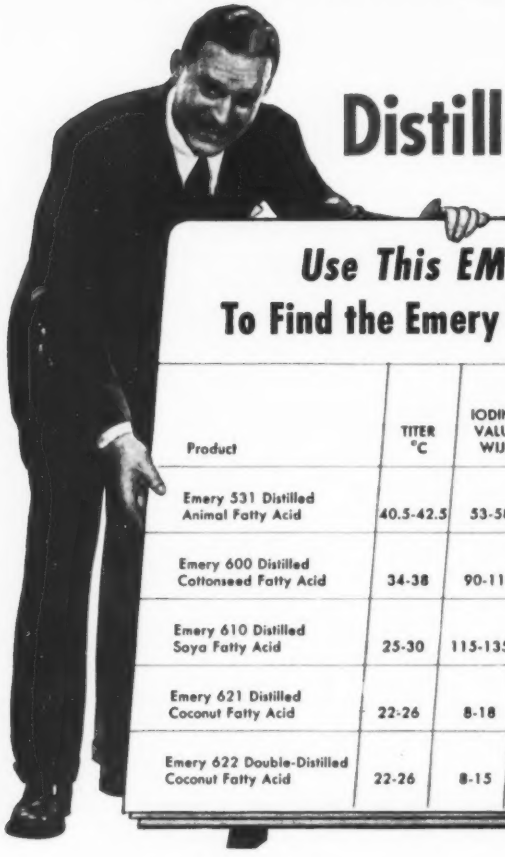
Need Consistent, Uniform Quality in your Distilled Fatty Acids?



Use This EMERY "CHECK-CHART" To Find the Emery Fatty Acid to Fit *your* needs

Product	TITER °C	IODINE VALUE WIJS	ACID VALUE (mg.KOH)	SAPONIFICATION VALUE (mg.KOH)	MAX. COLOR LOVIBOND (Yellow/Red)	TYPICAL GARDNER COLOR	TYPICAL FAC COLOR
Emery 531 Distilled Animal Fatty Acid	40.5-42.5	53-58	197-203	198-207	35/10 5¼" cell	6	3+
Emery 600 Distilled Cottonseed Fatty Acid	34-38	90-110	197-203	199-205	20/3.0 1" cell	8	5+
Emery 610 Distilled Soya Fatty Acid	25-30	115-135	195-201	197-203	10/2.0 1" cell	7	3+
Emery 621 Distilled Coconut Fatty Acid	22-26	8-18	255-266	257-268	30/6.0 5¼" cell	5	3—
Emery 622 Double-Distilled Coconut Fatty Acid	22-26	8-15	258-270	260-272	10/2.5 5¼" cell	4	1

Don't take chances . . . specify Emery Distilled Fatty Acids and be sure of the same high quality every time

When you specify Emery Fatty Acids for your products, you safeguard quality and ensure customer satisfaction. Whenever or in whatever quantity . . . you get the same unvarying, uniformly high quality.

For example Emery Double Distilled Coconut Fatty Acid (Emery 622) is one of the finest coconut fatty acids available anywhere. This as well as the other Emery Distilled Acids . . . Animal, Soya, and Cottonseed are held to within narrow specification limits. This strict quality, coupled with freedom from impurities will make your products better, stay better longer! For the best, buy Emery!

YOUR TECHNICAL PROBLEMS are the *problems of the Emery's Development and Service Department. Call on us for help in making your use of fatty acids more profitable, more effective.*

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Member—Dale V. Stingley

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Member—A. Scharwachter

Darling & Company
4201 South Ashland Avenue
Chicago 9, Illinois
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Member—G. G. Unkefer

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Whittier, California
Member—D. E. Murphy

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Cleveland 17, Ohio
Member—J. H. Baird

Mallinckrodt Chemical Works
New York 8, New York
St. Louis 7, Missouri
Member—C. E. Cosby

N. I. Malmstrom & Company
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Brooklyn 22, New York
Member—Ivar Wm. Malmstrom

Metasap Chemical Corporation
Harrison, New Jersey
Member—O. E. Lohrke

Monsanto Chemical Company
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Member—J. W. Newcombe

National Lead Company
105 York Street
Brooklyn 1, New York
Member—Alexander Stewart

National Rosin Oil Products, Inc.
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Member—Richard Bender

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Synthetic Products Company
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Cleveland, Ohio
Member—G. B. Curtiss

Swift & Company Industrial Oil Division
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Hammond, Ind.
Member—F. H. Beneker

Warwick Chemical Company
Division of the Sun Chemical Corporation
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Member—Dr. J. J. Whitfield

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Member—T. A. Graham

Geuder, Paeschke & Frey Co.
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Member—Willard J. Flint

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Chicago 38, Illinois
Member—G. D. Zuck

J & L Steel Barrel Company
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New York 17, New York
Member—Jerry Lyons

National Steel Container Corporation
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Member—Henry Rudy

Ohio Corrugating Co.
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Member—G. Wesley Gates

United States Steel Products Co.
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New York City 20, New York
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Member—R. P. Field

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Lincoln Engineering Company
5730 Natural Bridge Avenue
St. Louis, Missouri
Member—Foster Holmes

National Sales, Inc.
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Wichita, Kansas
Member—Howard Dearmore

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Member—Walter Duncan

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Stratford Engineering Corporation
1414 Dierks Building
Kansas City, Missouri
Member—J. W. Sylvester

REFINERS

Farmers Union Central Exchange, Inc.
P. O. Box G
St. Paul 1, Minnesota
Member—H. F. Wagner

Freedom Valvoline Oil Co.
Box G
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Member—D. A. Smith

Mid-Continent Petroleum Corporation
Tulsa, Oklahoma
Member—T. E. Fitzgerald

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4049 Pennsylvania
Kansas City 2, Missouri
Member—Dr. Geo. E. Ziegler

Petroleum Educational Institute
9020 Melrose Avenue
Los Angeles 46, California
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